

REMARKS/ARGUMENTS

Favorable reconsideration of this application, in view of the present amendments and in light of the following discussion, is respectfully requested.

Claims 1-5 and 8-20 are presently active in this case. The present amendment amends Claims 1-5, adds Claims 8-20, and cancels Claims 6-7 without prejudice or disclaimer. The present amendments of Claims 1-5 find non-limiting support in the disclosure as originally filed, for example at page 3, line 23 to page 4, line 7. New Claims find non-limiting support in the disclosure as originally filed, for example at page 9, line 15 to page 12, line 16 and page 13, line 14 to page 14, line 8. Therefore, Applicant respectfully submits that the present amendments do not add new matter.

The outstanding Office Action objected to Claim 3 due to a typographical error; and rejected Claims 1-5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,666,909 to TeGrotenhuis et al. (herein "TeGrotenhuis") in view of U.S. Patent No. 4,196,504 to Eastman (herein "Eastman") or U.S. Patent No. 6,158,502 to Thomas (herein "Thomas").

The specification is amended to correct minor informalities, grammatical and idiomatic errors. Applicant respectfully submits that the changes to the specification do not raise a question of new matter.

In order to vary the scope of protection recited in the claims, new Claims 8-20 are added. New Claims 8-20 find non-limiting support in the disclosure as originally filed, for example at page 9, line 15 to page 12, line 16 and page 13, line 14 to page 14, line 8. Therefore, Applicant respectfully submits that no new matter is added.

Independent Claim 14 recites, in part, *grains filling in the evaporator wick communicating hole configured to decrease conductance of the evaporator wick communicating hole*. Applicant respectfully submits that at least this feature is not taught or

suggested by the prior art. Therefore, Applicant respectfully submits that Independent Claim 14, and Claims 15-20 which depend therefrom, are allowable.

In response to the objection to Claim 3, the typographical error “gain” has been corrected to read “grain.” Applicant respectfully submits that no new matter is added by this amendment. Further, Applicant respectfully requests that, in light of the present amendment, the objection to Claim 3 be withdrawn.

In order to clarify Applicant’s invention, Claim 1 is amended to recite, in part, *grains filling in the communicating hole configured to decrease conductance of the communicating hole*. This features finds non-limiting support in the disclosure as originally filed, for example at page 3, line 23 to page 4, line 7. Further, Claim 1 is amended to recite, in part, *a vapor-liquid phase separating region configured to suppress heat transfer between the flow path of the liquid-phase working fluid and the path of the vapor-phase working fluid*. This features finds non-limiting support in the disclosure as originally filed, for example at page 9, line 23 to page 10, line 2. Therefore, Applicant believes that these changes to Claim 1 do not raise a question of new matter.

In response to the rejection of Claims 1-5 under 35 U.S.C. § 103(a), Applicant respectfully requests reconsideration of this rejection and traverses this rejection as discussed next.

Briefly recapitulating, Applicant’s invention relates to a thermal transport apparatus including a substrate having a flow path of a liquid-phase working fluid and a path of a vapor-phase working fluid, a first wick member disposed on at least one main surface of the substrate, a communicating hole provided in the substrate for communicating the flow path of the liquid-phase working fluid of the substrate with the first wick member, grains filling in the communicating hole configured to decrease conductance of the communicating hole, and a vapor-liquid phase separating region configured to suppress heat transfer between the flow

path of the liquid-phase working fluid and the path of the vapor-phase working fluid, as recited in amended Claim 1.

As explained in Applicant's specification at page 3, lines 6-13, with corresponding Figure 1, Applicant's invention improves upon conventional devices by providing a thermal transport apparatus capable of easily forming a capillary force generating portion in a flow path of a working fluid and in a first wick, stably circulating the working fluid in the thermal transport apparatus, and achieving a high efficiency of thermal transport. The claimed invention thus leads to an improved thermal transport apparatus.

Turning now to the applied prior art, TeGrotenhuis discloses methods and apparatuses for separating fluids and/or heat exchange. TeGrotenhuis, however, fails to teach or suggest Applicant's claimed thermal transport apparatus. In particular, TeGrotenhuis fails to teach or suggest Applicant's claimed grains filling in the communicating hole configured to decrease conductance of the communicating hole. The outstanding Office Action does not point out which element of TeGrotenhuis is identical to the grains filling in the communicating hole configured to decrease conductance of the communicating hole of the present invention. Applicant respectfully submits that TeGrotenhuis fails to teach or suggest Applicant's claimed grains filling in the communicating hole configured to decrease conductance of the communicating hole.

The outstanding Office Action rejects Applicant's Claims 1-5 based on the proposition that either Thomas or Eastman discloses the above feature, and that it would have been obvious to modify TeGrotenhuis by importing this feature from either Thomas or Eastman to arrive at Applicant's claimed invention. Applicant respectfully submits, however, that neither Thomas nor Eastman disclose the above feature related to grains filling in the communicating hole configured to decrease conductance of the communicating hole, as discussed next.

With respect to Thomas, the outstanding Office Action relies on the Abstract of Thomas. The Abstract of Thomas recites, in part:

A heat spreading apparatus includes a body with an interior surface defining a void. The interior surface includes randomly configured high aspect ratio micro surface capillaries.

Reading Thomas, a person of ordinary skill in the art would understand that the high aspect ratio micro surface capillaries are not Applicant's claimed grains filling in the communicating hole configured to decrease conductance of the communicating hole. In Thomas, the term high aspect ratio refers to a capillary depth to a capillary width ratio of at least 1:1.<sup>1</sup> The term micro surface capillary refers to the capillary structure defining a width that is less than 200  $\mu\text{m}$ . These high aspect ratio micro surface capillaries are formed from the intragranular boundaries found in nearly all materials. However, these micro surface capillaries are formed on a heat spreader by chemical etching in order to increase the velocity potential of the heat spreader.<sup>2</sup> Accordingly, the high aspect ratio micro surface capillaries in Thomas are not the grains filling in the communicating hole configured to decrease conductance of the communicating hole as would be required to meet Applicant's claimed feature. Therefore, even if the combination of TeGrotenhuis and Thomas is assumed to be proper, the combination fails to teach or suggest every element of Applicant's amended Claim 1. Specifically, the combination fails to teach or suggest the claimed grains filling in the communicating hole configured to decrease conductance of the communicating hole. Accordingly, Applicant respectfully traverses and requests reconsideration of this rejection based on these patents.

With respect to Eastman, the outstanding Office Action relies on column 4, lines 33-49 of Eastman. This passage of Eastman recites, in part:

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<sup>1</sup> See Thomas column 17, lines 58-67.

<sup>2</sup> See Thomas column 18, lines 5-60.

Upper guide ring 52 is provided with additional holes 54 through which metal powder 40 flows from a funnel 56. Enlarged heads 58 are formed on the tunnel-forming rods 28 to prevent their slipping through the holes 37 in upper guide ring 52. Tunnel forming rods 28 extend through the bottom of fixture base 60 through holes 62. Weights 64 are attached to tunnel-forming 28 rods to pull them straight and are held by set screws 66. Metal powder 40 is then added as before and the assembly fired at the same time, temperature and atmosphere.

Reading Eastman, a person of ordinary skill in the art would understand that none of the elements disclosed in column 4, lines 33-49 of Eastman are grains filling in the communicating hole configured to decrease conductance of the communicating hole. As explained in Eastman, metal powder of appropriate composition and particle size is poured into the annular cavity formed between the inside of the outer casing and vapor space mandrel.<sup>3</sup> The assembly is then fired in a furnace for an appropriate time and temperature and in the appropriate atmosphere to center the grains of powder to form the cylindrical portion of the wick. The metal powder 40 disclosed in Eastman is part of the wick itself, and is provided to reduce super heating of the liquid in the evaporator.<sup>4</sup> Accordingly, the metal powder in Eastman is not the grains filling in the communicating hole configured to decrease conductance of the communicating hole, as would be required to meet Applicant's claimed feature. Therefore, even if the combination of TeGrotenhuis and Eastman is assumed to be proper, the combination fails to teach every element of the claimed invention. Specifically, the combination fails to teach grains filling in the communicating hole configured to decrease conductance of the communicating hole, as recited in Applicant's amended Claim 1. Accordingly, Applicant respectfully traverses and requests reconsideration of this rejection based on these patents.

Additionally, Applicant respectfully traverses the obviousness rejection based on TeGrotenhuis in view of Eastman or Thomas because there is insufficient evidence for

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<sup>3</sup> See Eastman column 3, line 57 to column 4, line 2.

<sup>4</sup> See Eastman column 2, lines 4-15.

motivation to modify the device disclosed in TeGrotenhuis by incorporating either the metal powder disclosed in Eastman or the micro surface capillaries disclosed in Thomas, for the following reasons.

The outstanding Office Action states:

To combine the references [TeGrotenhuis, Thomas, and Eastman] would have been obvious to one of ordinary skill in the art in view of TeGrotenhuis' suggestion at col. 2, lines 30-37.

The record, however, fails to provide the required evidence of a motivation for a person of ordinary skill in the art to perform such a modification. More specifically, the portion of TeGrotenhuis cited by the outstanding Office Action as containing the motivation to combine the references discloses that the wick could be made of various materials, including sintered metals and other porous materials. Applicant respectfully submits that the disclosure in TeGrotenhuis that the wick can be made of various materials does not provide motivation to fill the communicating hole with grains that are configured to decrease conductance of the communicating hole.

Therefore, an attempt to bring an isolated teaching of Thomas or Eastman into TeGrotenhuis would amount to improperly picking and choosing features from different references without regards to the teachings of the reference as a whole. While the required evidence of motivation to combine need not come from the applied references themselves, the evidence must come from somewhere within the record. In this case, the record fails to support the proposed modification of the microsystem capillary separations taught by TeGrotenhuis.

The U.S. Court of Appeals for the Federal Circuit recently vacated a rejection under 35 U.S.C. § 103(a) based on similar grounds. In vacating the rejection, the Court stated<sup>5</sup>:

The record reflects that the examiner and the Board have managed to find motivation for substituting one type of memory for another *without*

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<sup>5</sup> *In re Beasley*, 2004 U.S. App. LEXIS 25055 (Fed. Cir. December 2004)



***providing a citation of any relevant, identifiable source of information justifying such substitution.*** The statements made by the Examiner, upon which the Board relied, amount to no more than conclusory statements of generalized advantages and convenient assumptions about skilled artisans. At least under the MPEP then in effect, such statements and assumptions are inadequate to support a finding of motivation, which is a factual question that cannot be resolved on "subjective belief and unknown authority." *Lee*, 277 F.3d at 1344. Under such circumstances, with respect to core factual findings, "the Board ***must point to some concrete evidence in the record in support***" of them, rather than relying on its assessment of what is "well recognized" or what a skilled artisan would be "well aware." (emphasis added)

Thus, the position that the microsystem capillary separations of TeGrotenhuis can be modified to arrive at the claimed thermal transport apparatus is insufficient to establish a *prima facie* case of obviousness.

In rejecting a claim under 35 U.S.C. § 103(a), the USPTO must support its rejection by substantial evidence within the record, and by clear and particular evidence of a suggestion, teaching, or motivation to combine the teachings of different references. As discussed above, there is no substantial evidence or clear and particular evidence, within the record of motivation for modifying TeGrotenhuis by incorporating the teachings of either Thomas or Eastman. Without this motivation and absent improper hindsight reconstruction, a person of ordinary skill in the art would not be motivated to perform the proposed modification, and amended Claim 1 is believed to be non-obvious and patentable over the applied prior art.

Further, as Claims 2-5 depend from Claim 1, Applicant submits that the rejection is traversed with respect to Claims 2-5 in light of the above discussion, in addition the additional features claimed in Claims 2-5 which are not taught or suggested by the cited references.

Additionally, Claim 1 is amended to recite, in part, *a vapor-liquid phase separating region configured to suppress heat transfer between the flow path of the liquid-phase working fluid and the path of the vapor-phase working fluid*. None of the cited references

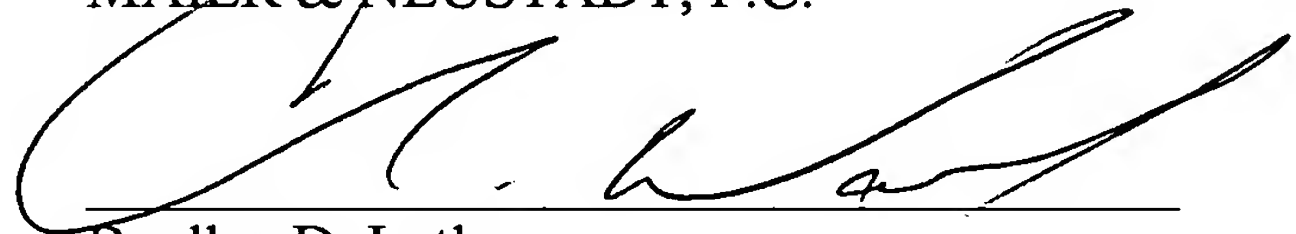
teach or suggest this feature. Therefore, in addition to the reasons discussed above, Applicant respectfully submits that the rejection of Claims 1-5 is traversed.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. An Notice of Allowance for Claims 1-5 and 8-20 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

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